This report is a tool to be used internally by the City of Lincoln, Public Works and Utilities Department to continuously monitor traffic flow along arterial streets and make signal timing adjustments necessary to accommodate changes in traffic volumes. The objectives of the signal timing adjustments are to maximize the progression of vehicles along the arterial (reduce travel time) and optimize individual intersection operations (minimize delay). However, achieving both objectives simultaneously may not always be possible. This report incorporates the traffic monitoring methodology "average speed" as identified by the City's Congestion Management Task Force in 1997. Although this report does make reference to using average speed as the "trigger" for identifying the need for additional study of an arterial, it does not dictate if, in fact, the "trigger" speed has been reached, nor is it the only deciding factor in determining the need for roadway improvements.

1.0 INTRODUCTION

It is the goal of the City of Lincoln, Public Works and Utilities Department, Engineering Services Division, to monitor the City's main arterials over time. Approximately every three years, each arterial should be monitored to track traffic patterns, growth and operations. In Spring 1998, the City contracted The Schemmer Associates Inc. (TSA) to conduct an analysis and study of traffic conditions on ten arterial corridors to use as a framework for future arterial evaluations. Along these ten corridors, travel time and intersection delay studies were conducted with the goal of improving traffic operations (decreasing delay and travel time; increasing average speed) through modified signal timings, rather than by widening City streets or other physical roadway improvements. The ten corridors included in this contract included:

- South 27th Street (Old Cheney Road to "O" Street)
- North/South 33rd Street ("A" Street to Cornhusker Highway)
- South 40th Street (Duxhall Drive to Randolph Street)
- South 48th Street (Nebraska Highway 2 to "O" Street)
- Superior Street (Cornhusker Highway to I-180)
- Cornhusker Highway (Superior Street/Havelock Avenue to 11th Street)
- Holdrege Street (70th Street to 27th Street)
- Randolph Street (56th Street/Cotner Boulevard to Capitol Parkway)
- South Street (56th Street to 9th Street)
- Old Cheney Road (Nebraska Highway 2 to Warlick Boulevard)

As a result of studies being performed as part of the East "O" Street Project (1999), an 11th corridor was added to this list:

- 56th Street (Nebraska Highway 2 to "R" Street)

All of the corridors listed above, which were studied during the Spring of 1998 and Fall of 1999, are shown in Figure 1.

In April 2000, TSA was contracted to conduct studies along six additional corridors as listed below:

- North 27th Street ("O" Street to I-80)
- North 48th Street ("O" Street to Superior Street)
- North 70th Street ("O" Street to Havelock Avenue)
- Nebraska Highway 2 (Old Cheney Road to Van Dorn Street)
- Pioneers Boulevard (56th Street to 33rd Street)
- Vine Street (70th Street to 14th Street)

These corridors, which were studied in the Spring and Fall of 2000, are shown in Figure 2.

Tasks performed as part of this project include:

1) Conducting "before" and "after" travel time studies along six arterial corridors and intersection delay studies at 34 locations. The objective of this task was to perform traffic engineering studies to quantify changes in traffic operations resulting from signal timing modifications. As described previously in this section, this task is also used to monitor the City's main arterials to track traffic patterns, growth and operations over time.

2) Conducting general data collection activities, including 6-hour turning movement counts at 70 signalized intersections and 48-hour mechanical ("tube") counts at 50 locations. The objective of this task was to collect traffic volume data, which is the basis of all traffic engineering studies and evaluations, for general use by City staff and others.

3) Performing signal timing optimization and coordination analysis for these six corridors. The objective of this task was to provide a coordinated traffic signal system to reduce vehicle delays not only along the specified corridors, but also at the intersecting cross-street approaches.

4) Evaluating signal operation opportunities during low-volume, off-peak time periods along the North 27th Street and Nebraska Highway 2 corridors. The objective of this task was to research and investigate alternative modes of traffic signal operation during low-volume, off-peak time periods, such as late-night hours.

5) Performing an assessment of the City of Lincoln's existing communication network for traffic control and refined the City's future communication network needs for traffic control. The objective of this task was to identify high-level communication requirements, including discussions with various communication providers, and the development of techniques and approaches for the deployment of the overall City of Lincoln ITS communication network.

6) Identifying the City of Lincoln's Intelligent Transportation Systems (ITS) User Needs. The development of the User Needs will set the stage for the City's future ITS studies and can be used at a later time in developing an implementation plan for ITS in the City of Lincoln.

Summaries of tasks 5 and 6 are provided in Volume II of this report. Volume II was submitted separately from Volume I.

All data collection activities, methodologies and calculations related to the travel time and intersection delay studies were performed based on nationally accepted engineering practices outlined by the Institute of Transportation Engineers (ITE).